III. Cooperating Networks

The NDACC recognizes there are important regional, hemispheric, or even global networks of instruments that operate independently of NDACC, but where strong measurement and scientific collaboration would be mutually beneficial. Such networks often have set up their own quality assurance guidelines, operational requirements, and data archiving policies, and they have national or international recognition in their own right. In such cases, bringing the complete network under the NDACC umbrella is neither practical nor desirable. Rather, designation of an interested external network as a "Cooperating Network" may be more appropriate, and can foster the desired collaborative measurement and analysis activities through mutual data access and mutual steering group representation. A protocol for Cooperating Network affiliation can be found on the NDACC web site http://www.ndacc.org/.

The following independent networks have finalized agreements with NDACC for scientific collaboration as NDACC Cooperating Networks.

Advanced Global Atmospheric Gases Experiment (AGAGE)
http://agage.eas.gatech.edu/index.htm

AGAGE performs real-time, high-frequency measurements of approximately 45 trace gases at stations around the world and interprets these measurements using 3D models and inverse theory to further our understanding of ozone depletion and climate change and to address verification issues arising from the Montreal (ozone) and Kyoto (climate) Protocols. AGAGE utilizes the *Medusa* GC-MS and GC-multidetector instruments and is distinguished by its capability to measure at high frequency, all the important species in the Montreal Protocol and all non-CO_2 gases in the Kyoto Protocol. The scientific objectives of AGAGE are important in furthering understanding of global chemical and climatic phenomena. They are:
(1) To determine optimally from observations the global rates of emission and/or destruction (i.e. lifetimes) of anthropogenic chlorocarbons, chlorofluorocarbons (CFCs), bromocarbons, hydrochlorofluorocarbons (HCFCs), hydrofluorocarbons (HFCs) and perfluorocarbons (PFCs) that contribute most of the reactive halogen to the stratosphere and/or are strong infrared absorbers.
(2) To document accurately global distributions and temporal behaviors of the biogenic/anthropogenic gases important in climate change and/or ozone depletion: methane, nitrous oxide, carbon monoxide, hydrogen, methyl chloride and methyl bromide.
(3) To determine optimally the average concentrations and trends of tropospheric hydroxyl radicals from the rates of destruction of atmospheric methyl chloroform, HFCs and HCFCs deduced from their measured mole fractions together with estimates of their emissions.
(4) To determine optimally, from atmospheric observations and estimates of their destruction rates, the magnitudes and distributions by region of surface sources/sinks for these gases.
(5) To provide accurate data on the global accumulation of these trace gases, which are used to test the synoptic/regional/global-scale circulations predicted by three-dimensional models.
(6) To provide global and regional measurements of methane, carbon monoxide and hydrogen, that together with estimates of hydroxyl levels, can be used to test primary atmospheric oxidation pathways at mid-latitudes and the tropics.

Professor R. Prinn (MIT) is the principal investigator for overall leadership and coordination of AGAGE, and for data processing and theoretical analysis for all AGAGE gases. Professor R. Weiss (SIO, UCSD) is the principal investigator for the experimental parts of AGAGE with specific responsibility for the Cape Matatula, Samoa, Trinidad Head, CA and La Jolla, CA stations and absolute calibration. Professor P. Simmonds and Dr. S. O'Doherty (University of Bristol) are the co-investigators in charge of the Mace Head, Ireland and Ragged Point, Barbados stations. Drs. P. Fraser and P. Krummel (CSIRO) are the AGAGE co-investigators supervising the Cape Grim,Tasmania and Aspendale, Australia AGAGE stations, the Cape Grim air archive, and inter-comparisons with other laboratories. Dr. R. Wang (GaTech) is the AGAGE co-investigator in charge of meteorology-related data processing and archiving and AGAGE website maintenance, and works under Prof. Prinn (MIT) on theoretical analysis. Drs. S. Reimann and M. Vollmer (Empa) are the principal investigators for the AGAGE-affiliated station at Jungfraujoch, Switzerland. Drs. F. Stordahl and C. Lunder are the principal investigators for the Ny-Alesund, Norway AGAGE-affiliated station. Dr. M. Maione (U. Urbino) is the principal investigator for the Monte Cimone, Italy AGAGE-affiliated station. Dr. Y. Yokouchi (NIES) is the principal investigator for the Hateruma Island, Japan AGAGE-affiliated station. Dr. K.-R. Kim is the principal investigator for the AGAGE-affiliated station at Gosan, S. Korea. Dr. L. Zhou is the principal investigator for the ShangDianzi, China AGAGE-affiliated station. Contact information for these individuals is available at <http://agage.eas.gatech.edu/pi-copis.htm>

Aerosol Robotic Network (AERONET)

http://aeronet.gsfc.nasa.gov/

The AERONET (AErosol RObotic NETwork) program is a federation of ground-based remote sensing aerosol networks established by NASA <http://www.nasa.gov/> and (Univ. of Lille 1 <http://www.univ-lille1.fr/> , CNES <http://www.cnes.fr/> , and CNRS-INSU <http://www.cnrs.fr/>) and is greatly expanded by collaborators <http://aeronet.gsfc.nasa.gov/new_web/collaborators.html> from national agencies, institutes, universities, individual scientists, and partners. The program provides a long-term, continuous and readily accessible public domain database of aerosol optical, mircrophysical and radiative properties for aerosol research and characterization, validation of satellite retrievals, and synergism with other databases. The network imposes standardization of instruments <http://aeronet.gsfc.nasa.gov/new_web/system_dml>, calibration <http://aeronet.gsfc.nasa.gov/new_web/system_descriptions_calibration.html>, processing <http://aeronet.gsfc.nasa.gov/new_web/system_descriptions_processing.html>, and distribution <http://aeronet.gsfc.nasa.gov/new_web/system_descriptions_distribution.html>.

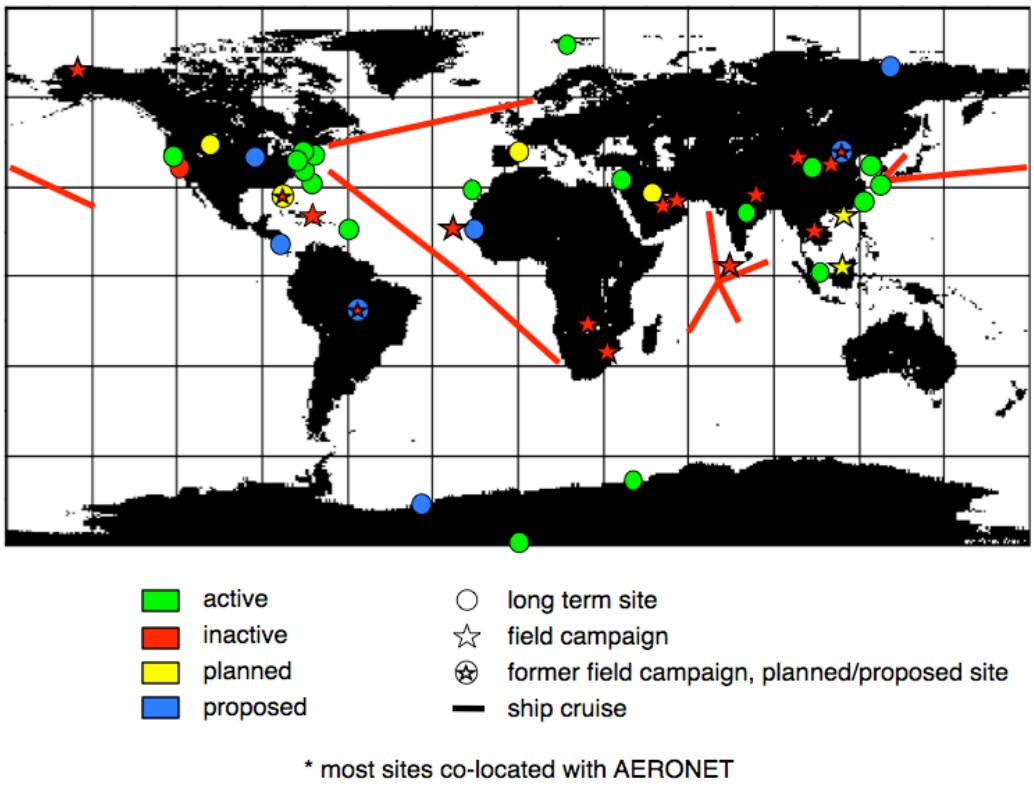
AERONET collaboration provides globally distributed observations of spectral aerosol optical depth (AOD), inversion products, and precipitable water in diverse aerosol regimes. Aerosol optical depth data are computed for three data quality levels: Level 1.0 (unscreened), Level 1.5 (cloud-screened <http://aeronet.gsfc.nasa.gov/new_web/Documents/Cloud_scr.pdf>), and Level 2.0 (cloud-screened and quality-assured <http://aeronet.gsfc.nasa.gov/new_web/Documents/Quality_Control_Checklist.pdf>).

Inversions, precipitable water, and other AOD-dependent products are derived from these levels and may implement additional quality checks.

Micro Pulse Lidar Network (MPLNET)

http://mplnet.gsfc.nasa.gov/

The NASA Micro Pulse Lidar Network (MPLNET) (*Welton et al.*, 2001) is a federated network of Micro Pulse Lidar (MPL) systems designed to measure aerosol and cloud vertical structure continuously, day and night, over long time periods required to contribute to climate change studies and provide ground validation for models and satellite sensors in the NASA Earth Observing System (EOS). At present, there are eighteen active sites worldwide, and three more in the planning stage. Numerous temporary sites have been deployed in support of various field campaigns and two more are planned in 2010. Most MPLNET sites are co-located with sites in the NASA Aerosol Robotic Network (AERONET) (*Holben et al.*, 1998) to provide both column and vertically resolved aerosol and cloud data. MPLNET data and more information on the project are available at http://mplnet.gsfc.nasa.gov .



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NOAA/ESRL/GMD Halocarbons and other Atmospheric Trace Species (HATS) Network
http://www.esrl.noaa.gov/gmd/hats/

The National Oceanic and Atmospheric Administration's Earth System Research Laboratory (NOAA/ESRL) maintains a global in situ and flask network that started in 1977 for the measurement and analysis of halocarbons and other atmospheric trace gases. The purpose of this work is to study atmospheric trace gases that affect climate change, stratospheric ozone depletion, and air quality from observations at NOAA and cooperating stations. The analyses of flask samples and in situ data are conducted within the Global Monitoring Division (GMD) in Boulder, Colorado, USA. Through collaborations with the National Aeronautics and Space Administration and the National Science Foundation, NOAA/ESRL operates a number of in situ and flask collection instruments from aircraft up to 21 km, and balloon platforms up to 32 km. These measurements have been associated with campaigns that have spanned the globe beginning in 1991. The HATS Network measures over 30 trace gases in the atmosphere including nitrous oxide (N_2O), chlorofluorocarbons (CFCs), hydrochlorofluorocarbons (HCFCs), hydrofluorocarbons (HFCs), methyl halides, numerous other halocarbons, sulfur gases (COS, SF_6, CS_2), and selected hydrocarbons. This research has resulted in numerous peer-reviewed publications and has contributed to international assessments of climate and ozone depletion. Data are available via anonymous ftp at ftp://ftp.cmdl.noaa.gov/hats .

Dr. James W. Elkins, group chief, is responsible for the network and airborne measurements within the HATS group. Dr. Stephen A. Montzka is the principal investigator responsible for the gas chromatograph and mass selection detection of flask samples collected from stations located globally and also from regional aircraft that sample the troposphere. Dr. Bradley D. Hall is the principal investigator in charge of our trace gas standards research and prepares most of our trace gas standards. Geoffrey S. Dutton is the principal investigator responsible for in situ measurements at stations located at Pt. Barrow, Alaska; Summit, Greenland; Niwot Ridge, Colorado; Mauna Loa, Hawaii; Cape Matatula, American Samoa; and South Pole, Antarctica.

Southern Hemisphere Additional Ozonesondes (SHADOZ) Network

http://croc.gsfc.nasa.gov/shadoz/frame_home.html

The Southern Hemisphere Additional Ozonesondes (SHADOZ) is a project to augment balloon-borne ozonesonde launches and to archive data from tropical and subtropical operational sites. The project was initiated in 1998 by NASA/Goddard Space Flight Center with NOAA and international co-investigators in Europe, South America, Asia and Africa. There are currently twelve operational stations in the network with three heritage stations. The collective data set provides the first profile climatology of tropical ozone in the equatorial region, enhances validation studies aimed at improving satellite remote sensing techniques for tropical ozone estimations, and serves as an educational tool for students, especially in the participating countries. As a flexible archive, SHADOZ has grown and evolved as scientific needs and research questioned change.

Data are collected and available publicly at the SHADOZ official website: http://croc.gsfc.nasa.gov/shadoz. Station locations, Co-Investigator contacts and technical details of the operations are also archived at the website.